Civic markets: the case of the California energy crisis

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Abstract: Did California's great 'deregulation' experiment fail? Was it flawed in the first instance as most economists argue? Or was the deregulation of a public 'good' (such as energy) and as such a civic 'trust'? What role does public policy play in economic decisions?

No matter what the opinions about the causes of the energy crisis, the result is the same: the crisis has created a 'challenge' for all 34 million Californians. In fact, the challenge is for all Americans as it is in other countries as well. The reasons are clear: can energy like water, waste or the environment be subject to market forces? Or are these sectors qualitatively different from telecom, transportation, or manufacturing sectors? California has had to confront this basic issue directly since the energy crisis erupted in the summer of 2000.

The actual causes of the energy crisis may never be really uncovered even after protracted lawsuits, but three issues became clear in the 'challenge': understanding that a 'higher' public good, hence role for government in certain infrastructure sectors such as energy, exists. Second, leaving such public good infrastructures to the 'free market' is both naïve economics and flawed logic. The fact that only a few power generation companies control the flow of energy into California demonstrates the faculty of free markets equals more competition. Finally California has embarked on a journey with immeasurable consequences. For the first time in modern history, a nation's state must take control of its own destiny. Sustainable development will now be defined over the next few years of the New Millennium.

The paper will focus on the economic and business issues surrounding energy with specific recommendations on 'sustainable development' drawn from the California challenge.

Keywords: Markets; energy; economics; SMEs; systems planning.

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1 Introduction

Teaching business economics for many years has proved to be a valuable lesson in providing a background for other scholars in understanding the energy sector and the creation of new approach to business economics: civic markets. For example, most advanced undergraduate, students begin with classes in something like Economics No. 101 on 'free markets' from the philosophical neo-classical theories of supply and demand of Adam Smith and contemporary variations from a number of scholars [1]. One of the clear messages, however, appears in Economics No. 102 where the "competition of nations and firms" is promoted through the works of Michael Porter and others [2].

What becomes obvious in these classes is the ideological message that competition in the market will produce winners and losers. Economics No. 201 then teaches what mergers and acquisition will transpire. Cost benefit analysis, internal rate of return and stock valuations follow in order to maximise shareholder profit. It is in the more advanced classes for the MBA and PhD or in business law classes that the lessons are taught that have a direct impact on the energy and other sectors that are in the public trust such as water, waste and the environment [3].

Economics No. A1, for example, for graduate students clearly outlines the role of government in finance, procurement, regulation, tax avoidance and net profits. In other words, in the undergraduate courses, students learn that government should have nothing to do with business. Aside from an invisible hand, government in general is bad. "Government cannot pick winner technologies" nor can "government officials operate businesses profitably". In graduate courses like Economics No. A2, however, students learn just the opposite. Students may know that government has historically played a fundamental role in the creation of new businesses through R&D, procurement and sector investment like defence and the military through its various finance mechanisms. This is true in the USA and perhaps even more so in other industrialised countries where government is a true partner with industry.

Yet it is Economics No. C-D, the final graduate courses that are the most pertinent courses to understanding the energy crisis facing California and the USA. Here the students learn that control of markets and even some control or influence over government spending can result in monopolies with huge profits. This is the current status of the California energy crisis whereby a few firms control the vast majority of the energy generation flowing into California. There is no competition, but only

monopolistic control of energy production. Below Table 1 outlines the magnitude of the issue now confronting the State and soon other states.

Table 1 Power profits - megawatts, mega profits

Company	*Headquarter*	*No. of large plants in CA*	*Megawatts*	*2000 Profits (in millions)*	*Profits Increase - since 1999*
AES Corp	Arlington, VA	3	4,076	$641	+181%
Duke Energy	Charlotte, NC	2	2.092	$1.178	+18%
Dynergy/NRG	Houston, TX	4	3.208	$452	+210%
Mirant (Southern)	Atlanta ,GA	2	2,702	$366	+36%
Reliant	Houston, TX	4	3,474	$838	+65%
Totals		15	15,552	$3475	+510%

Source: Sacramento Bee (California Energy Commission), April 2001

2 The science of economics

This paper concerns public policy. It assumes that despite the entire debate, it is public policy that directs, influences and sets in motion economic strategies, tactics, and programs. The author admits to being 'new' to government but not new to business, economics, or programmatic implementation. What the California energy crisis has taught is a basic ideological conflict with the public policies that had promoted conventional neo-classical economics since the early 1980s in the USA and UK in particular and this century where a new form of public policy now questions that ideology based on philosophical ideological differences, practical experience and empirical facts. Hence this paper provides a counter ideology to neo-classical economics that we call 'civic markets'.

Consider Reinhert [4] who, in a brilliant analysis of economic theory, examines economics in the context of history. He concludes that economic theory has 'physics envy' and moved into 'biology envy' as its paradigms developed and went from describing the mind to understanding matter. The parallel in economics can be seen in neo-classical economics as it staunchly adhered to a perfectly balanced system between supply and demand in all sectors that provided the base for evolutionary economics, transactional economics, and the more applied economic development 'clusters' theories.

The basic philosophical roots of these economic theories, however, are in need of close examination [1]. Reinhert describes the envy of economists on physics as an attempt to make economics a 'science', hence:

> "In today's economic theory we find this tension reflected in the movement of economic theory from 'physics envy' towards 'biology envy' and in the increasing importance of innovations - the creativity of man's mind - added to the physical matter of the products being exchanged." [4, p.285]

In other words, the field of economics has tried to model itself on the hard sciences, like physics. See Chomsky [5] and McNeill and Freiberger [6] for a critique of how the social

sciences try to emulate the hard sciences and constructive approaches to making social science more scientific. Clark and Fast [1] demonstrate how science as formalism from linguistics can be applied successfully to economics. McClosky, quoting Einstein in 1953, put it more precisely that "whoever undertakes to set himself up as a judge in the field of Truth and Knowledge is shipwrecked by the laughter of the gods." [1, p.161]

Nevertheless, economics can be considered a science, if it decides to act like one. For example, consider how one physicist described his discipline:

> "Physics is often described as the fundamental science as it seeks to understand the 'rules' or 'laws' by which the universe operates. It is interesting to speculate if we will ever fully understand these 'rules' and why they operate in the first place. The latter question is, however, today the domain of the philosopher and the theologian." [7, p.1]

In other words, if economists were more concerned with understanding the rules and laws of economics, then the field would approximate the natural and physical sciences. Again

> "Physics is a true science. That is, the test of its validity is the experiment. Thus, our understanding of the 'rules' of physics come from knowledge confirmed by observation and experimentation and not from intuition or belief. (The word 'science' comes from the Latin *scientia,* 'to know')." [7, p.1]

Science is not just quantification and statistics. It must consider what is observed and experimented with. In short, science is a creative endeavour. What most economists fail to understand is that creative and innovative underly the basis for science. These basic events, activities and phenomena are what economists could consider as business activities for example. Understanding them can then lead to broader or more universal understandings expressed in terms of rules and laws.

With the work of Schumpeter [8,9] and some of his contemporary proponents and the biological (or evolutionary) approach to economic theory, the effort to be more like a science has developed. From this perspective a number of important theoretical concepts have emerged including the notion of entrepreneurship and dynamic economic development.

3 Public policy – the role of government

Perhaps the single most significant issue for most economists from the conventional neo-classical paradigm is that government has no role in the economics or business of any nation. Consider Porter [10] on 'The role of government'. He argues that national competitiveness "assign(s) government the preeminent role" [10, p.680]. Government has a role, ultimately it is a "partial one" [10, p.681]. Hence, "National competitive advantage in an industry is a function of underlying determinants that are deeply rooted in many aspects of a nation" [10, p.680]. Hence, "Government's proper role is as a *pusher and challenger* (emphasis in original [10, p.681].

He suggests therefore "At the broadest level, one of government's most essential roles is signaling" [10, p.681]. This means "identifying and highlighting the important priorities and challenges they (firms) face" [10, p.681].

Porter and others argue as well that there is no ideology in this study. He calls his works, "Ideologically neutral" [10, p.736] with the end of the Soviet Union and

Communism. Yet he concludes, "we feel a sense of relief at this economic convergence" [10, p.737]. Nevertheless in a clear ideological salute to neo-classical theory:

> "This study ... has led me to a conviction that incentives, effort, perseverance, innovation and especially competition are the source of economic progress in any nation and the basis for productive, satisfied citizens." [10, p.736]

> "This study demonstrates that whatever the system of values or ideology at home, firms meet in global competitive markets ..." [10, p.736]

In what perhaps is the most blatant declaration that the Anglo-Saxon mythical economics of Adam Smith exists boils down to: "Social intervention is not conducive to experimentation and innovation, and it blunts productivity growth. Too much government support also eliminates the willingness of the private sector to invest and take risks" [10, p.738]. This is a false statement in both fact and theory. However, what becomes more disturbing is the assertion that "Companies and nations have the power to choose between the false allure of concentration, collaboration, and protection, and the reaffirmation of an economic order based on innovation, competition, and rewards for effort" [10, p.738]. Finally, Porter concludes that this is "our best hope for sustained economic prosperity" [10, p.738]. California found out just the opposite in its pursuit of an energy marketplace.

> "The usefulness of a State in this process arises out of the Renaissance concept of the *common weal* - or the 'common good' - a systemic dimension which is lost in the atomistic and static structure of today's mainstream economics." [4, p.3]

> "At a very simple level, a common weal arises out of the synergies stemming from the sharing of fixed costs - either resulting from specialised tools or from specialised knowledge …." [4, p.3]

He uses example of blind men and an elephant.

The idea is that government intervention (as in the early Adam Smith argument for targeting certain industries to help) is not for the individual, consumer or producer but for the society as a whole.

> "The actions emanating from an understanding of a systemic common weal are very different from the idea of distributive collective action - in a setting of static rent-seeking and zero-sum games - (as found) in modern Anglo-Saxon economics." [4, p.4]

Herein, to:

> "Discuss the role of the State in economic growth and in the history of economic thought as being torn between two fundamentally different economic outlooks: a *production-centered* and activistic-idealistic Renaissance tradition and a barter-centered and pessimistic-materialistic tradition of Adam Smith, David Ricardo and neo-classical economics." [4, p.4]

Neo-classical economics has a mechanical view of the world "centered around barter, accumulation, physical metaphors, equilibrium, and optimality. In this mechanical view (e.g. the 'dismal science') a fundamental characteristic of Man is his propensity to barter" [4, p.4].

The basic problem with Smith's approach was that he sought static rent-seeking rather than dynamic rents. He produced a theory (system) that removed the engines of growth as they had existed before in the world economies. His reliance on market and less intervention were helpful but he argued that:

1 knowledge was of no value to either society or the individual. This can be seen today when economic theory "predicts equalisation of wages between nations exchanging goods produced at extremely different skill levels."

2 theories removed human institutions since they produce absurd results.

3 the atomistic view "removed all systemic effects and constructs a theory of individuals void of any uniqueness, all governed by their 'human nature' which is the same in all human beings." He does not believe in any collective action or common weal [4, p.46].

It is this common weal that we label the 'civic market' in reference to the energy sector as well as water, waste and environment. China and Denmark are examples of countries where certain sectors of the economy are considered off limits to pure 'market forces' [11]. However, most of the western European countries are clearly based in the same economic philosophy where the government has a key role in the development, support and expansion of certain sectors [12]. It can be argued that even the USA is based in this same economic philosophy as it has had a policy of economic and business support in the military and defense sectors for over 60 years [13,14].

Denmark, for example, is a country with an energy policy that has not been 'left to the free market'. Since the oil crisis in 1973, Denmark has succeeded in implementing a number of important elements of sustainable development in the energy sector. Energy saving measures such as the insulation of houses have been introduced. Renewable energy technologies, particularly wind turbines have been developed and implemented and energy efficiency in the production of power such as CHP (combined heat and power production) has been substantially expanded.

Consequently, Denmark has managed to stabilise the gross energy demands in less than a 30-year period. This stabilisation has been achieved simultaneously with a 'normal western European' economic growth. For example the Danish GDP has increased by 60% from 1972 to 1996. Thus energy intensity (defined as GDP divided by the gross energy consumption) has fallen by 37% in the same period. In other words one GDP unit in 1996 cost only two thirds of the energy consumption that it used in 1972.

The success is based on the formulation of relatively clear objectives in the form of official energy plans and policies. These plans have been formulated in the context of a constant interaction between Parliament and the public in which contributions from university researchers, in terms of alternative energy plans, has played an important role.

This ability to act as a society can be explained by the high degree of public awareness of informed energy choices. The Danish energy policy has been conducted with the attitude that 'Creating choices is possible'. This awareness has had the following conditions:

- A high degree of public participation: at first in the protest against nuclear power, then in energy savings (mainly in house heating) and then in building and owning wind power and small CHP stations.

- An intensive public debate, in which alternatives have been described, discussed and developed.
- A relatively independent Parliament, which has to some degree been able to conduct policies against the interest of the representatives of the old fossil fuel technologies.
- An organisation of power companies, which have been able to survive even when they lose market shares. Therefore the struggle has not been a matter of life and death [15].

4 The energy sector: a challenge

Below are several specific cases and programmatic public policy programs are given as examples as to how to meet the energy challenge. Much of the content of the discussion provides the basis for a formal presentation to policy makers in California. Hence the long-term (ten-year) public policy goals for the California energy challenge are:

- Ensure that all Californians have reliable, affordable and cleaner energy.
- Achieve a diversified energy base, by increasing the share of renewable sources of power to one-quarter (25%) of the total..

The more immediate or short-term challenges are:

- Meet the short-term energy needs of all Californians through conservation, efficiency, and emergency measures that lead to a long-term integrated system.
- Develop a plan for increasing the diversity of future power generation sources and transmission methods.
- Create a cabinet level entity to consolidate energy-related functions, and coordinate inter-agency resources for greater efficiencies.

The electric energy crisis in California is a challenge for all its citizens. This crisis has deep historical roots. Experts have shown that the problems associated with the current situation are the result of a complex web of events, many of which predate the State's actual electrical restructuring and many that were not even part of the restructuring. Yet the 'design flaws' as some economists label it, were not the only problems. Nor can experts point to the 'so-called' success of other states or nations.

The current energy challenge provides the opportunity to implement the policies, strategies, practices, pricing and financing structures, commitment to partnership and innovation, along with leadership and public good, for California to continue as a leader in energy efficiency and self-sufficiency. These elements provide a path that is sustainable through business cycles, market factors and public policy behaviour changes over the short term that fit in a long-term strategy consistent with the public good of California's citizens.

Leaving energy, water, environment or waste, among other infrastructure sectors to the 'market' or 'competitive forces' of supply and demand was wrong in the first instance. The predictable results were monopolies of supply. Instead, all governments must adhere to a higher standard for the public good. The basic issue in other words is a

'philosophical', and hence political one. Governments cannot allow monopolies of vital infrastructure sectors like energy.

The purpose of business is to make money and with that control markets as well as to quell competition. Basic economics teach this perspective and are apparent in historical understanding of other vital public sector infrastructures, such as transportation, telecom and IT. The USA government's court case against Microsoft is a recent example. This does not mean that these sectors must be heavily regulated or controlled by the government. Indeed, that would be difficult and counterproductive. However history has shown that there is a need to consider the public good in certain infrastructure sectors [16]. Equally important, there are business opportunities in these sectors, as when electricity and transportation sectors are integrated and hence can share the need, leverage resources, and lower prices [17]. Energy and environment like water and waste, should not be subject to such economic and business forces [18].

It is this last point that perhaps is the most significant for those who have searched for a definition of 'sustainable development' since the Brundtland Report in the late 1980s.

> "Sustainability is one of the most ubiquitous words in contemporary development discourse … (as it is) a well-accepted value as far as environmental protection is concerned, but its implementation has been slow because of perceived conflicts with other community goals, especially economic development." [19, p.1]

California is in the midst of becoming the first 'sustainable' nation-state. More significantly, it is transforming the energy and environmental protection regulations from the past decade into the opportunities for new emerging technologies, clean energy and environmental industries. As Porter and van Linde [20] and Clark [3] note, environmental regulations can spawn clean economic and business development. Investment in renewable energy and environmental technologies, generation and related emerging technologies is critical [21].

5 Planning – long-term energy trends and issues

Projected California energy requirements for the year 2020 are: 40% more electrical capacity, 40% more gasoline, and close to 20% more natural gas. Additional large gas-fired energy plants need land, water, and fuel; they produce air emissions and other impacts requiring mitigation.

There is a need for additional oil refinery capacity yet there are no plans for a new capacity where six billion gallons of gas would need to be imported. However, gasoline when combined with increasing transportation demand and traffic congestion will result in a significant increase in air emissions. Furthermore, the need for additional natural gas pipelines into and within California will most certainly create stranded costs. As Meyer [16] notes, by the end of this Century, the gas supply will be exhausted.

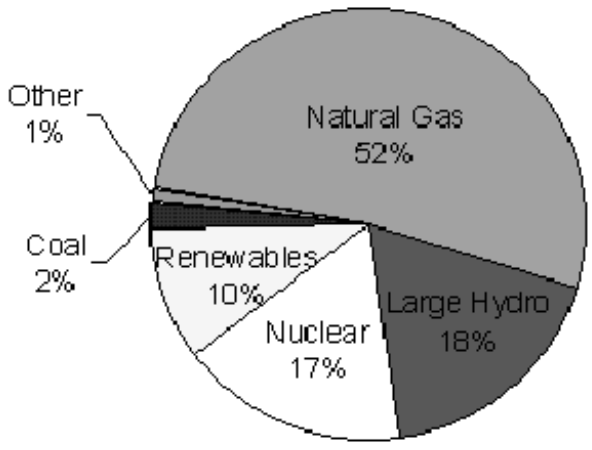
Whilst the energy crisis in 2000-01 has the attention of the public at the moment, over the long-term, demand reduction strategies must become a 'way of life' for California businesses and residents. California ranks as the tenth largest user of energy in the USA and is among the top three states in conservation, efficiency and demand reduction. Nevertheless that is not enough to avoid predicted energy shortages throughout 2001 and into 2002.

The implementation of energy-conservation policies in Denmark has also included the electricity sector. The nature and complexity of the needed technological changes call for public regulation instruments of the same nature, i.e. numerous, differentiated and multi-purpose [22]. In February 2001, the Governor, for example, announced an energy conservation goal of 10% demand reduction by the State government and asked citizens to seek at least 8% reduction. In March 2001, statistics showed an overall 9% reduction from the year before. To achieve the longer-term goal, however, the State and its local government, business and civic partners are seeking specific policies such as:

- Promoting pricing structures that change behaviours, either through the stick of higher prices for energy inefficiency, or through the carrot of lower prices for energy efficiency.
- Creating the public will to accommodate new price structures (including higher prices) through public education and other means that will help to achieve the goal.
- Developing financial incentives and investment strategies (such as use of incentives for energy efficient programs for rebates, tax credits, etc to consumers and industry that could be linked to economic development programs for manufacturers and suppliers to locate in California) to assure that long-term demand reduction is built into return on investment calculations.
- Providing venture and risk capital for the basic research and technology transfer required to generate large-scale and effective technological innovation and adoption.

By the summer of 2001, a number of new power peaker plants will be constructed and several more are in the approval stage. These plants will address the immediate need for more capacity in the near term. This additional power supply will require primarily the use of natural gas, most of which must be brought in to the State. This approach will need to be incorporated into a long-term fuel source diversification strategy so as to limit future dependency on any one type of fuel.

Figure 1 Share of current in-state power generation fuel mix



Source: Rand Institute, February, 2001

In developing its long-term strategy for energy, California needs to address energy issues such as supply and transmission. Part of the tactical definition of sustainability includes the control over, or at least the setting of, rules for commerce and business. Assuming that energy is a commodity (electrons) that must be regulated or rules are set by government for its use, then there is a need for the State to have control/rule making over energy generation and transmission. The functional analogy is the 'internet'. Aside from both having the same commodity (electrons), the systems are similar in other ways and useful for understanding a vision of the future of energy in California and most likely elsewhere in the world.

Consider the following parallels between energy and the internet. Both were created through government funding and finance. While the energy sector has been in existence much longer, the internet points to future directions for energy. With government funding the internet came into existence. Few practitioners realise that the government still has control and rule making over the internet. As with energy, the internet exists for the public good, but encourages business, personal and non-business activities. Secondly, the internet is a dispersed system. It does not have a single or even regional central computer. The same is likely for energy where there will be 'dispersed' energy systems [23] or distributed energy systems on the local level [24]. Energy will not be subject to a central grid and control by only a few companies.

Finally, the internet and energy infrastructures share futures. In reality, the future of energy is unknown in terms of new power systems, generation, and technologies. This unknown demands creativity, innovation, and business acumen. In this future world, the internet shares an uncertain future with energy. One thing is certain: the public and the private sectors must be partners in the future of both as they impact upon each other and other infrastructures.

How will California get there – to the future – from where it is now? A number of strategies are emerging that focus on the above goals. For example:

1 Increase control over energy sources through a combination of public and private sector policies, consortia and contracts to assure self-sufficiency over the long term.

2 Cycle out older, inefficient and dirty generation facilities and dated transmission lines for both electricity and natural gas to promote increased efficiencies and reduce bottlenecks.

3 Increase the geographic proximity between the location of supply and demand to achieve more efficient and equitable systems.

4 Increase State and local government support through collaborative ownership of the renewable energy (wind, solar, geothermal, bio-mass, etc.) generation market, which would help diversify the energy base, stabilise prices and allow better management of risk.

6 A policy framework for energy - economic planning

Given these issues, trends and strategies to meet the California energy goals, as well as new positive opportunities on the horizon, what are the new ideas that can guide California's plan to meet its future energy needs? Clearly, there are a number of perimeters that frame a plan for the future. The basic areas to consider are:

1 Learn from the past. The past 30 years of energy trial and error are a vital source of lessons, both positive and negative, about how to manage our energy future. We must be candid about what has worked and what has not.

2 Make decisions in the near term that align with long-term goals and strategies. The current crisis which no doubt will be resolved in the near future - provides our challenge and hence an opportunity for all sectors to provide future Californians with reliable, affordable and clean energy for the long term. Our decisions today clearly frame our choices for tomorrow.

3 Operate through collaboration and partnership whenever possible. With the necessary changes in policy, resource commitments, behaviour and increased capacity, all partners from the household, community, and regional levels in the business and civic sectors together must help solve this problem.

4 Enhance California's energy self-sufficiency. California must accurately project, measure and monitor its actual energy needs, and develop a sufficient supply to meet those needs, using a mix of conventional and alternative energy suppliers, coupled with increased efficiencies and demand management strategies. Future fuel supplies should be based on a diversity of sources, to avoid market distortions from over-reliance on one or a few sources.

5 Use new 'return on investment' models for public sector investment. Create an investment finance model, as used in other states and industrialised countries with considerable success, which allows equity investment, particularly venture and risk capital for energy and environmental research, early product development, etc.

6 Create new public sector accounting methods such as those used now in the private sector, known as 'green accounting.' Traditional accounting cost-benefit models that only promote governmental incentives include tax breaks, rebates or loan guarantees, with varying degrees of success are not adequate.

7 Typically managed through a public-private partnership, a high priority is a return on the investment for all investors. Government needs to be able to have an 'equity stake' in its investments through grants, finance mechanisms and incentives.

8 Integrate energy efficiency and self-sufficiency into all infrastructure systems. All California infrastructure investment, whether land use, or housing, school facilities or water delivery, should be held to the highest standard of energy efficiency, including:

   Transportation, which accounts for about 40% of the State's total daily energy consumption. Water, which requires more energy than it currently generates. Waste, which through biomass and other environmental methods potentially can generate large amounts of power.

10 Efforts should be made to ensure efficient technology transfer across Infrastructure systems e.g., fuel cells can serve two infrastructures at the same time for example: energy and transportation [25]. The fuel cell can be used in a vehicle for daily usage, and also be used to power one's residence.

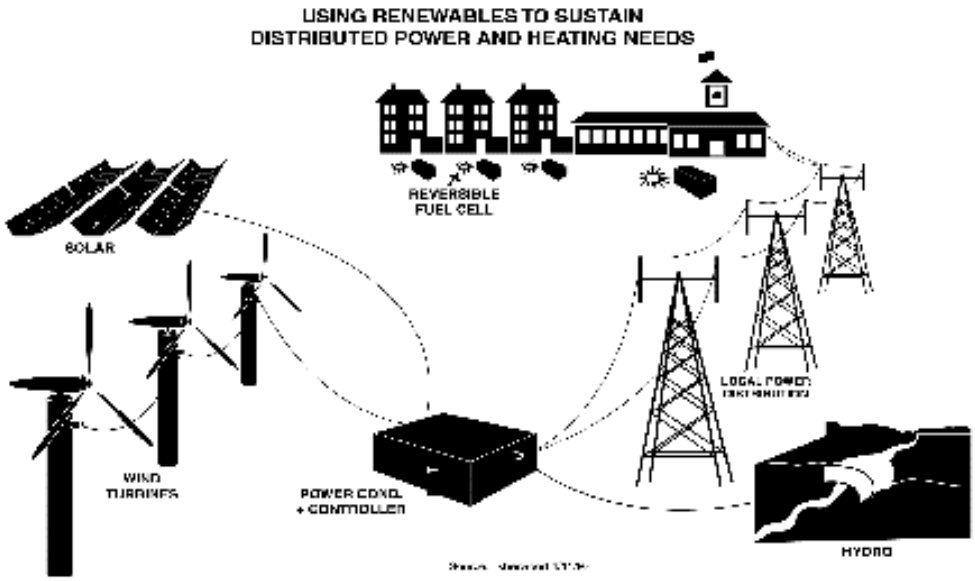
11 By turning a crisis to a challenge and thus into an economic opportunity. California will be the leader in sustainability – with energy and environment synonymous with economic growth and business development.

That is the challenge from the energy crisis. Building on the investments that the State has made already in the diverse tools and technologies for renewable and alternative energy sources, we can develop our future energy capacity consistent with the State's commitment to clean sources of energy. We can work with leadership companies to foster and disseminate information on best practices for use by other public, civic and private sector partners.

7 Local energy systems: economic dispersed and distributed energy

Distributed energy systems or local and region control over energy within the Overall State framework for sustainability form the basis for a new energy infrastructure. There is great potential for distributed energy generation systems, especially renewable or clean energy systems. Developed primarily in Europe, many communities in the USA are now developing similar programs, focused in many cases on co-generation or combined cycle (the combined production of heat and electricity) using renewable energy. See Isherwood *et al.* [26] on how modeling of such distributed energy systems would work in remote communities. Figure 2 is an illustration of how a local distributed energy system could work.

Figure 2 Using renewables to sustain distributed power and heating needs



The implementation of local dispersed energy solutions in Denmark has put the country in a leading international role got the insulation of houses, but also in the generation of renewable energy such as the development and building of wind turbines and CHP plants. Wind power now produces approximately 15%of electricity demands and 50% is

produced in CHP. Both CHP and wind power are still being expanded. Together this means that Denmark has become an international leader in terms of facing possible regulation problems. Presently Denmark is discussing whether to integrate heat pumps and storage devices into the local energy systems, or whether to export surplus electricity production [15].

8 Conclusions: economic strategies for state government

> "Energy efficiency gains come without adding to air pollution, ecological disruptions or global warming. And energy efficiency improvements cut the risk of power shortages" [27].

California has the potential to become a 'sustainable nation-state' relative to energy. To achieve sustainability, Californians must continue to think differently in the future about their 'energy infrastructure'. In conclusion, the Californian energy policy and plan will need to focus on increased efficiencies and development of a diverse mix of energy supply, both generated in or imported into the State. It will need new ways to distribute these power sources. As a 'bellwether' nation-state, California has the opportunity to lead the world in energy efficiency and self-sufficiency. Thinking of this emerging energy infrastructure as a parallel model to the new telecommunications infrastructure – the Internet – can be helpful in developing our future path.

In Denmark the recent development can be seen as a struggle between the 'liberalisation approach' and the 'democratisation approach'. The 'liberalisation approach' focuses on the objective of market reorganisation and corporate competition. The belief is that even though it is evident that most European power companies are in the process of joining one another across international boundaries, the market will lower consumer electricity prices. Globalisation in the form of monopolistic control of markets rarely leads to lower prices for anyone. The myth or mistaken belief also is that 'professional' investors now should replace former public participation. Knowing this, however, most European countries are either reversing the trend to liberalisation (or privatisation) or insisting that the national or local governments retain substantial ownership in the power companies.

The 'democratisation approach' has limited resources and environmental objectives in focus. The belief is that further technological changes need organisational changes, and therefore independent public regulation is needed, perhaps now on an international scale, especially if public issues like climate change and sustainable development are considered. Moreover public participation is a condition for further improvements and therefore should be promoted and developed. This is precisely the approach that the Bush Administration has taken in the USA now that it officially acknowledged the failure of its 'energy policy' presented in Spring 2001 as 'a statement of reality' or historical numbers from the US Department of Energy.

Denmark on the other hand, in its energy reform policies must be seen as a sort of compromise between the two approaches. In this light it can be understood why the Danish reform contains what appear to be many contradictions. On the one hand, the reforms have ambitious objectives of increasing the rate of renewable energy (mostly wind power), but on the other hand the reform weakens the economical conditions for privately owned wind turbines. Another contradiction rests in the notion that the reform

tries to secure consumer influence in power companies, but then the reform opens the possibilities for the selling of consumer owned power plants [15].

9 Public-private partnerships

California has the mechanisms in place for local and regional clean distributed energy systems. The State Government Code already provides for Community Energy Authorities (No. 5200) for local and regional energy systems. With local governments, the private sector, educational and research institutions, as well as non-profits, all working together as partners, clean energy is viable along a business model for recovering costs and providing for innovation and change [28]. Implementing such partnerships includes strategies such as:

- Promotion of collaborative strategies among public and private sector firms and organisations working on energy infrastructure issues.
- Dissemination information on new models and best practices, including with the utilities and planner/builder/development community.
- Provision of additional resources and technical assistance to implement best practices, including green building and site design, product development, and installation of energy efficiency systems (per Governor's Executive Order).
- Convening multi-sector leadership on a State/Regional Partnership for Sustainable Energy.
- Encouraging California-based philanthropies and the commercial media to work with the public sector on public education and participation, and inform readers and viewers on energy issues.

10 Financing, accounting and investing

The implementation of new policies and programs cannot be done until basic public finance issues are addressed and resolved. Efforts are currently under way to do just that so that international accounting principles, for example, which will be the future standards for all American accounting systems, can be applied to Californian expenditures now in the energy and environment sectors. For example, the cost accounting measures for the public sector, such as exist in New Zealand, Denmark, Germany and other countries, can be similar to the ones that exist for the private sector. These accounting methods calculate the value of public investment in renewable energy, environment, water and other sectors in terms of their economic costs, savings of conservation and efficiency strategies. Additionally a number of initiatives are under way:

- Utilise conventional financial mechanisms (e.g., the California Infrastructure and Economic Development Bank) as well as new tools (See Commission Finance Strategies) for regional and community distributed generation capacity, purchase of energy savings equipment, retrofits, etc.

- Establish an 'Energy Seed Capital Fund' and an 'Energy Investment Fund' targeted to energy and environmental business development opportunities, with a focus on early product research and development, operating through equity investments.
- Develop procurement procedures across infrastructure categories to improve cost savings.
- Provide incentives to upgrade existing generation and transmission facilities with state-of-the-art technologies, and for metering and other real-time price mechanisms.
- Promote the newly created FHA Energy Efficient Mortgage rolled out by the California Housing Finance Agency.
- Increase incentives for development of transportation-related alternative energy and alternative vehicles markets.
- Invest in new technologies and systems (e.g., state and private universities centres of excellence) to develop and commercialise new technologies and applications.
- Change the State Constitution to allow State funds to be used for 'equity' investments and financial returns.

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